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BIRD-BANDING

A Journal of Ornithological Investigation

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AND
THE INLAND BIRD-BANDING ASSOCIATION

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BIRD - BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

VOL. II JULY, 1931 NO. 3

RETURNS OF SONG SPARROWS IN 1931

By MARGARET MORSE NICE

IN 1930 there were forty-seven adult nesting Song Sparrows and ninety-nine fledgelings banded on Interpont—the flood plain extending three fifths of a mile between the Doddridge Street and Lane Avenue bridges east of the Olentangy River in Columbus, Ohio. For my purposes I divide this region into three districts: North Interpont, about ten acres in extent, all waste land growing little else but weeds, blue grass, and elders, ideally suited to *Melospiza melodia beata;* Central Interpont, about thirty acres, with some trees and partly cultivated; and South Interpont, about ten acres, mostly to the south and west of a city playground. Central Interpont is the scene of my special studies, but this past winter I have spent much time on North Interpont also, because of the settling there of a number of my banded juveniles.

From late January on, I devoted several hours a day (except for an absence April 3d and 4th) covering Central and North Interpont, attempting to trap the birds and watching for new arrivals. Some trips were made to South Interpont, and occasional visits to the west side of the river, and also below the lower bridge for an eighth of a mile and above the upper one for half that distance to study every Song Sparrow for the discovery of banded individuals. I believe that I have found every banded bird on Interpont and in the immediate vicinity.

The adult male Song Sparrow goes directly to his territory, affording no chance of trapping him at a central point. His arrival on his land is advertised far and wide by his persistent singing; the coming of his mate is signalized by his sudden lapse into silence. All nestlings have been banded on the right leg; all birds trapped in the fall on the left. Nestling adults are furnished with colored celluloid bands in addition to the government bands.

COMPOSITION OF THE POPULATION

At the beginning of the nesting-season of 1930 Interpont was filled practically to full capacity with Song Sparrows, but in 1931 this was no longer true.

Table I gives the number of pairs found April 6th in both years.

TABLE I

NESTING PAIRS OF SONG SPARROWS FOUND ON INTERPONT

	April 6, 1930	*April 6, 1931*	*Average Size of Territory, 1930*
North	16	17	.66 acre
Central	38	31	.78 acre
South	14	12	.71 acre
	68	69	

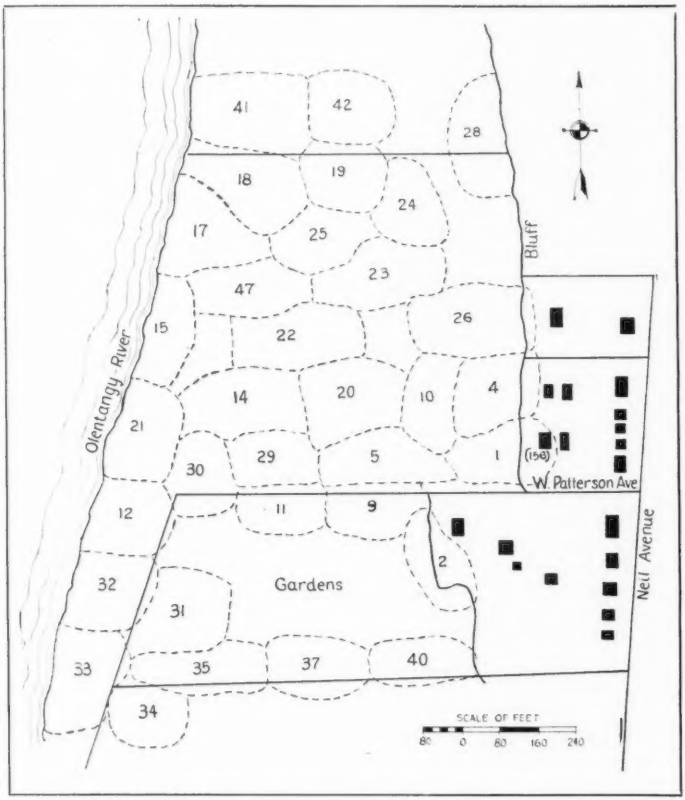
The greatest decrease occurred in Central Interpont, where there was a loss of 18 per cent. Conditions for nesting both on Interpont and the vicinity were not different this spring from last. The only explanation is that there were not as many Song Sparrows available to nest here as a year ago. Despite what seemed to me a fairly successful nesting-season[1], the Song Sparrow population did not maintain itself from 1930 to 1931.

Nearly half the male Song Sparrows here are permanent residents, this being true of twenty-five to twenty-seven of the sixty birds on Interpont, April 6, 1931. Each adult resident male stays on or near his own territory throughout the year. Three factors last winter helped me in individualizing those resident males that had not been banded. First, the number of winter visitants of this species was abnormally low. Second, unseasonably warm weather the last of January caused the residents to come out of the weeds and proclaim their territories in true late-February fashion. Winter visitants sing comparatively little. Finally, the fact that resident birds are darker than those that have wintered farther south is often a help in determining the status of an individual.

TIME OF ARRIVAL

The Summer Resident Males. Dates of arrival of twenty-three summer resident males follow, a number in parenthesis being placed before a date when more than one bird appeared: February 8, 18; March 2, (3) 4, (3) 17, 19, 20, (5) 20-22, (3), 23,

[1] *Wilson Bulletin*, XLIII, June, 1931.



MAP I

Song Sparrow Territories on Central Interpont, June, 1930.

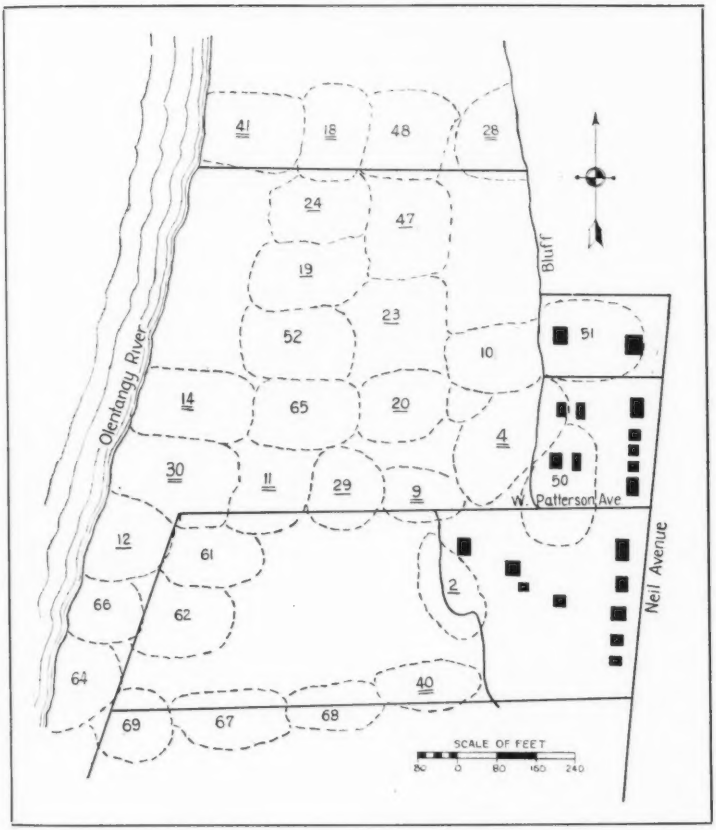
25, 26; (2) April 3–5. A small migration occurred from March 2d to 4th, but the chief increase in numbers took place from the 17th to the 26th. On March 5th there were thirty-seven nesting males on Interpont, or 62 per cent of the total found a month later; on March 16th there were forty-six, or 77 per cent; on March 25th fifty-five, or 92 per cent. This is strikingly different from 1930, when sixty-four were counted March 5th and 6th, or 94 per cent of the early-April population.

As to the banded males, in only two cases were the dates of arrival in both 1930 and 1931 known. No. 19 (see Map II) was banded near our house March 5, 1930, but appeared on his territory two hundred fifty yards northwest at the astonishingly early date of February 8, 1931. (He could not have been overlooked before, for all adult resident males had been singing freely since January 24th, I had been over this area daily, several of his songs were familiar to me, and, finally, he was banded with celluloid as well as aluminum.) No. 10 arrived on his territory, one hundred yards west of the house, March 15, 1930, but did not appear this spring until April 3–5. Dates of arrival of other banded adult males in 1931 were February 18, March 17, 19, 20, (2) 23; April 3–5.

Of the eight males banded as nestlings in 1930 that survived to establish territories on or near Interpont (one settled just above the upper bridge), seven were resident birds. The other arrived March 30th.

The Females. Both in 1930 and in 1931 the appearance of a small number of females the third week in February has been a puzzle to me. In 1930 one (recorded as a dark bird) joined her mate February 21st, and another settled on a neighboring territory February 22d. Both came to their ends early in the nesting-season. This year there were five of these early dark females on Interpont—two at the north end, three near the center. The latter joined males 14, 9 and 12 on February 21st, 22d, and 24th respectively. One of the north birds was present February 25th, but I believe had been with her mate as early as February 8th. She disappeared the middle of March. The other was not seen until March 7th, but this pair had probably been overlooked before that. It occurred to me that these females might be permanent residents, so I made a special effort to band the four as soon as possible In April two of them were shot by boys, so my chance of settling the status of these birds is slim indeed.

No summer-resident female appeared before March 17th. The dates of arrival of twenty-five others were as follows: March 20, (2) 22, (5) 23, (3) 24, 26, 27; (3) April 1, (6) 3–5,



MAP II

Song Sparrow Territories on Central Interpont, April 6, 1931. Males known to be the same as last year underlined: summer residents once, residents, underlined twice.

(3) 6. In 1929 four females came between March 11th and 21st; in 1930 five summer residents (I noted the earliest as light in color) appeared between March 1st and 15th.

Banded adult females returned March 23; (2) April 1, (2) 3–5, 6. A banded juvenile female was found at the south end of Interpont March 26. I do not know how long she had been present.

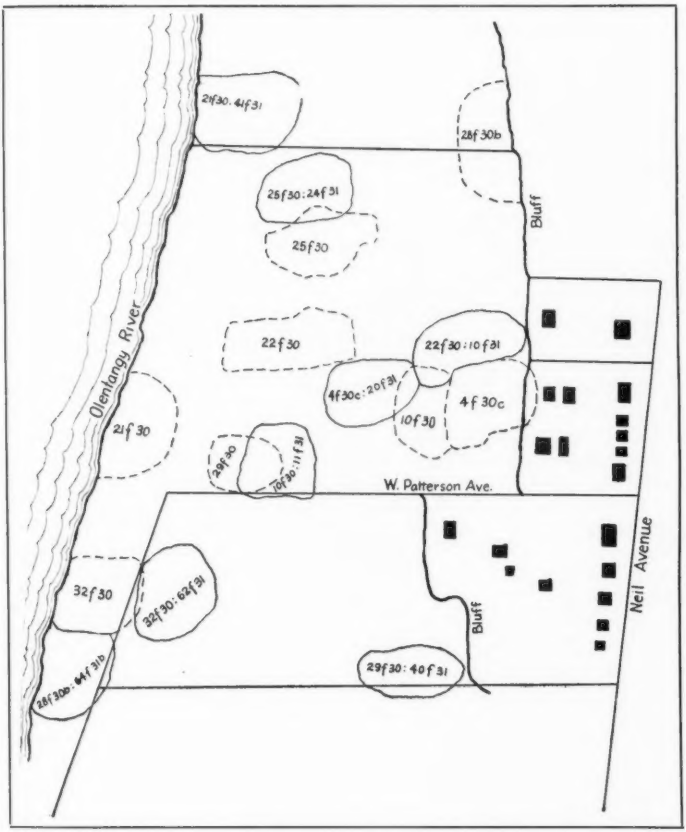
The Migration and the Weather. It was not only the nesting Song Sparrows that were slow in arriving. In 1929 the transients of this species were recorded from March 11th to 27th, the height of the migration coinciding with a warm spell from the 21st to the 24th. In 1930 I noted a few on March 5th and 14th, a great migration March 15th, and a few March 22d and 27th. In 1931 scattering birds were observed March 3, 6, 14, 15, and fair numbers March 23 to 25; the majority came March 26 to 31, while a few were still present April 5th. As to other species, of twelve March migrants for which I have records for four years, three came on an average three days early, one appeared on time, while eight averaged five days late.

TABLE II

WEATHER IN COLUMBUS

	Mean Temperature		*Maximum Temperature*		*Difference Between Maximum and Minimum*	
	February	*March*	*February*	*March*	*February*	*March*
1929.....	26.2	47.4	33.9	55.9	15.4	17.1
1930.....	40.4	38.6	47.9	47.7	14.9	18.2
1931.....	36.8	37.3	43.7	43.2	13.8	11.8
Normal....	30.9	39.1	38.0	48.0	16.0	17.0

Table II gives the mean and maximum temperatures and also the difference between the maximum and minimum of February and March in 1929, 1930, and 1931, and also of the "normal", *i.e.* the mean of the last fifty-one years; these are taken from the records of the United States Weather Bureau for Columbus. 1929 was characterized by a remarkably warm March throughout the month; 1930 by an extraordinary warm wave from the 18th to 26th of February and mild weather again from the 5th to 24th of March. But in 1931, although the mean temperature of February was high, the temperature range was small. March was persistently cool, with even less temperature range than February. The consistently cold weather of this month was apparently responsible for the delayed migration. It would appear that the arrival of Song Sparrows in this region depends to a considerable extent upon the presence or absence of warm waves.



MAP III

Territories of Banded Females that Returned in 1931. 1930 territories shown with broken lines; 1931 with solid lines.

RETURNS OF BANDED BIRDS

The Adults. On April 6, 1930, there were on Central Interpont thirty-one males whom I knew (twenty-seven from bands; four from distinctive songs). A year later seventeen survived, 55 per cent. Fourteen of the thirty-one were residents; twelve were summer residents only, while the status of five was unknown. Nine of the survivors were residents and eight were summer residents. Six of the casualties occurred in the breeding-season, seven during the winter, and the other perhaps in the fall. Twenty-five males were known to have survived the summer; 68 per cent of these were present at the beginning of the following nesting-season. Twelve summer residents were seen in the fall; four of these, one third, failed to return.

Of the twenty banded females, eight returned in 1931—40 per cent. Since five had been killed in May or June, the return percentage of possible survivors was 53. Nine of the banded females were recorded in the fall, and of these only four returned.

Fifty-one known adults were present at the beginning of the breeding-season in 1930; of these twenty-three, or 45 per cent, survived to begin the following nesting-season.

The Juveniles. Of the ninety-nine banded nestlings that left the nest in safety, eight males established territories and one to three females returned. Five of the resident males took up their territories the following number of yards from their birthplaces: 150, 250, 250, 500, 550. Two birds that were nest-mates settled 150 and 350 yards respectively north of their home. The summer-resident bird lives 300 yards south of his birthplace.

Three females banded on the right and hence presumably juveniles, returned to Interpont. One of these disappeared with her mate before I had time to trap her; perhaps they moved east into town, having been disturbed by a clean-up campaign that involved their territory. I made many efforts to trap another, but she came to her end in early May with her identity unsolved. The third is nesting 200 yards from her birthplace.

RETURNS TO TERRITORIES

The Males. The Song Sparrow territories in Central Interpont in June, 1930, are shown in Map I. In Map II the territories on April 6, 1931, are given; on the former date there

were thirty-two males; on the latter, thirty-one males. I know that 50, 51, 52, 64, and 65 are new birds, the first four being juveniles, but how many of the other "sixties" were listed in 1930 in the "thirties" I do not know: 48 is probably 42, but I have no way of proving it. This year I hope to have every adult Song Sparrow nesting on Central Interpont banded.

It will be noted that six males have almost exactly the same territories this year as last—2, 40, 12, 20, 41, and 28. Three have spread out a little because of more room—4, 9, and 10. Others have moved somewhat because of death of old neighbors and arrival of new—14 and 23. 29 and 11 have shifted their relative positions.

More change is shown by 18, 19, 24, and 47 than any of the others. I do not know why 18, a resident, elected to move north. 19 on his early arrival February 8th found a clear field to choose from and evidently preferred his present position to his old one. 47 came next, and, finding 19 and 52 occupying his last year's territory, took up 24's. When that individual arrived, he adopted the piece of land recently vacated by 18.

It seems as if a pair needs a territory of about two thirds of an acre and does not usually occupy more during one nesting. If there is plenty of room they may spread over a larger area after the young have left the nest, and thus their season's territory may be greater than it would have been under crowded conditions.

The Females. Map III shows the territories both years of the eight banded females that returned. My scheme of nomenclature has already been explained in this journal,[2] but a few words on the main features may not be amiss. Each female is designated according to her mates—10f30 meaning 10's mate in 1930. In 1931 this bird mated with 11, therefore her whole name is 10f30:11f31. If a male has more than one mate in a season, each female receives a letter at the end of her name, —a, b, c, as the case may be.

In no instance does a banded female have the same mate as last year. Two of the males (22 and 25) did not return, one (21) had been shot by a boy in January, and three (4, 28, and 29) were already mated when their last year's mates appeared. 10 arrived so late this year (April 3–5), that it is possible that his mate of 1930 had reached Interpont before he did. I can

[2] *Bird-Banding*, 1930, I, pp. 177-181.

say nothing of 32, for he was not identifiable by me after the nesting-season of 1930.

Five of the females came back about as near to their former territories as circumstances permitted—4f30c, 10f30, 22f30, 25f30 and 32f30. 21f30 moved 250 yards from her old home, 29f30 moved 200 yards, and 28f30b moved 400 yards. 29f30 could have chosen a mate nearer home than she did, for there were four bachelors in that vicinity at the time of her arrival.

It is evident that the female returns to the region where she nested, and it seems reasonable to suppose that if her mate were present and unattached she would rejoin him. During one nesting-season she knows all of her mate's songs and responds to them; in the case where the second year she settles next door (as 4f30c did this season and 1f29 did in 1930) she has to ignore the old stimuli and learn to react to a new set.

CONCLUSIONS

It is a curious thing that half of the nesting male Song Sparrows in this immediate region are permanent residents, while the other half are summer residents. As to the females, most of them are certainly summer residents, but it is possible that a very small proportion are permanent residents.

Melospiza melodia beata is a home-lover and an individualist. Half the males in this region appear to spend all their adult lives within the space of a few acres. The other males and the females, although journeying south for the winter, return to their territories and remain on them from six to eight months out of the year. The Song Sparrow is an independent creature, not over fond of flocking, even in the winter, and not migrating *en masse*. The same bird may arrive at very different times in successive years; some of the females come before some of the males, and some of the adults come later than the juveniles.[3]

156 West Patterson Avenue, Columbus, Ohio, May, 1931.

[3]In order that our readers may receive a further account of Mrs. Nice's Song Sparrow studies at this locality we are mailing with this issue of *Bird-Banding* a paper dealing with the results of her last summer's work published in the current number of *The Wilson Bulletin*. It has been made possible to do so through the kindness and generosity of Mrs. Nice.
EDITOR.

BANDING THE LAST HEATH HEN

By ALFRED O. GROSS

THE last Heath Hen, the sole survivor of his race since December 8, 1928, a bird which is free to roam the scrub-oak plains of Martha's Vineyard Island, Massachusetts, was trapped and marked with two numbered metal bands on April 1, 1931. As soon as the bird was banded and photographed it was again liberated in his favorite retreat among the scrub oaks, apparently none the worse for his experience.

In the past the Heath Hens came each spring to the clearings or open grasslands to go through their weird courtship performances. The last bird, true to the traditions of his race, visits the meadow on the farm of James Green, near West

Tisbury, which is its ancestral booming-field. Because of this curious instinctive trait it is possible to entice this bird to within a few feet of a wooden blind set up in the midst of the field where it comes with unfailing regularity. The blind enabled the observers to trap the bird as well as to study and photograph it at close range.

The trap employed was a simple iron frame covered over with fish-seine netting, the latter being used instead of wire to prevent injury to the bird. The trap was released by a string running from the trigger stick to the blind. The day on which the Heath Hen was trapped there was a steady downpour of rain. The bird came out of the scrub oaks at 6.45 A.M. and walked steadily but cautiously toward the vicinity of the blind to secure the grain which had been placed there to lure it to close range. The bird exhibited no fear of the blind and at first paid not the least attention to the traps, entirely new objects in the environment of its feeding-place. The bird ate greedily of the grain, adjusted its plumage to shed the rain, and then settled down in the grass stubble with its head facing toward the driving "northeaster". In about a half-hour it sauntered towards the trap, and after a brief inspection entered to pick at the ear of corn used as bait. It was an exciting moment inside the blind; the least false move would mean failure. Promptly at a prearranged signal the trap was released and the last Heath Hen was made a temporary prisoner. Though the heavily overcast sky and heavy downpour of rain made conditions unfavorable for photography, moving pictures and stills were made of the entire procedure.

Two bands were used. An aluminum band, number 407880, was placed on the tarsus of the left leg and a copper band, number A-634024, was fastened to the right tarsus. It is desirable to have both legs marked in the event of the bird's being killed by some predatory animal or hawk and the two legs torn apart and separated. In the future, after the death of the bird, if either leg is found the remains can be readily identified. The bands will also serve as a definite identification as long as the bird continues to live. The banding operations did not seem to harm the bird in the least. It returned to the blind the very next day, giving the observers an opportunity to secure additional moving pictures.

The last Heath Hen is a splendid, well-groomed male. It is heavy, plump, and exceedingly strong and resistant. An examination of the bird revealed no trace of disease or external parasites, which were common among its last companions examined by the author in past years. There is no way of as-

certaining the age of this bird, but since the last record of any young was in 1924, it is probable this individual is at least seven years old, and perhaps much older. Birds are known to live long lives, and it is possible for the Heath Hen to live on for a considerable time. The last two Passenger Pigeons which were in captivity at the Cincinnati Zoölogical Society, Cincinnati, Ohio, were more than twenty years old at the time of their death. How many years the last Heath Hen will prolong the life of its race cannot be predicted, but it is truly remarkable that this lone bird has been able to escape all of the vicissitudes of the elements and the constant danger of predators and disease. This fact is further emphasized when we review the recent history of the decline of these birds and note how rapidly the flock was reduced to one bird. In April, 1924, the annual census accounted for fifty-four birds, but in spite of the combined efforts of the State, the Federation of Bird Clubs of New England and other organizations the birds decreased rapidly. In 1927 there were thirteen birds, only two of which were females. In the autumn of that year seven birds made their appearance. This flock appeared regularly on the open meadow of the Green farm, but during the course of the winter it dwindled one by one until only three males remained at the time of the annual census in April, 1928. At the approach of summer the birds dispersed, as usual, to the dense scrub oaks, where in the course of their wanderings one more bird was lost, and only two Heath Hens returned to the Green farm in the autumn. The two birds were reported almost daily until December 8, 1928. Since that date only one bird has been seen, which we believe is the last of his race.

The three photographs of the last Heath Hen shown were taken prior to 1931.

In recent years many earnest requests have been received that those in charge of the last Heath Hen secure a female Prairie Chicken or some other grouse (as the Ruffed Grouse), as a mate for this last lone bird, either for practical or purely sentimental reasons. In the past many attempts were made to introduce the Prairie Chicken, the close relative of the Heath Hen, to Pennsylvania and the plains of New Jersey, Long Island, and Massachusetts, including Martha's Vineyard. Although these introductions were made in large numbers and with great care, every one of them resulted in failure. Likewise introductions of the Heath Hen, when these birds were abundant on Martha's Vineyard, made to Long Island and the mainland of Massachusetts, never proved a success. All attempts to rear the birds in captivity failed. It is appar-

ent that Pinnated Grouse (Heath Hen and Prairie Chicken) do not lend themselves to such methods of conservation and are very sensitive to any change in their environment. They are not adaptable and are totally unlike the hardy Pheasant, which can be readily transplanted from one part of the country to another. But grant that an introduction of Prairie Chickens to Martha's Vineyard would be successful, there would be only the remotest chance that the last Heath Hen would mate successfully with the Prairie Chickens. One reason of the failure of the Heath Hen to raise young since 1924, when there were still a number of females present with the males, was the fact that excessive interbreeding had brought about declining sexual vigor and sterility. This was further evidenced by the examination of several male birds in which the sexual glands were degenerated, and therefore there is reason to believe that our last Heath Hen is sterile. As far as the many suggestions we have received for mating the Heath Hen with a female Pheasant or with a Ruffed Grouse, they may be dismissed as such a cross is not possible. Incidently it may be noted that Ruffed Grouse and Pheasants are already resident on the Island.

HEATH HEN NOT THE LAST OF THE SPECIES

A comparative study of the Heath Hen and Prairie Chicken from the standpoint of their history, distribution, and plumage-variation, as well as a detailed comparison of their life-history, their courtship, and their behavior, is convincing that the Heath Hen and the Prairie Chicken are the same species and that they differ only as subspecies. The birds are merely geographical races. In prehistoric times the Heath Hen and the Prairie Chicken were present in an uninterrupted distribution from the Atlantic seaboard to the plains east of the Rockies, but subsequent isolation resulted in certain differences in the Eastern and Western representatives, such as relative amount of pigmentation in the feathers, number and shape of the pinnate feathers, etc. These differences, however, are so small and so variable that I consider that William Brewster was not justified in describing them as distinct species, as he did in 1885. This opinion, advocated in a report on the Heath Hen in 1928, has now been accepted by the Check-List Committee of the American Ornithologists' Union.

Therefore, the bird on Martha's Vineyard, although the last Heath Hen, is not the last of its species, which is to-day abundantly represented in many States of the Middle West

in the form of the Prairie Chicken. Although this interpretation may take away much of the glamour and romance attaching to the Heath Hen, nevertheless the last bird on Martha's Vineyard has fired our imagination and has served to focus public attention on the necessity of taking immediate positive steps for the conservation of our wild life. If this bird serves as a warning of what may happen to other game-birds, the thousands of dollars expended by the State and various organizations and individuals will not have been spent in vain.

Bowdoin College, Brunswick, Maine.

PROGRESS OF CONSERVATION IN CANADA[1]

By HOYES LLOYD

TO BEGIN with, it is desirable to outline Canada's organization for conservation. The nine provinces and the Yukon Territory have control of game matters within their boundaries with certain definite exceptions. The North West Territories are administered by a Branch of the Department of the Interior, which Branch also has jurisdiction over game matters in the Territories. The chief exceptions to this general rule are, first, that the Department of the Interior administers the Migratory Bird Treaty throughout Canada, and, second, that the same Department has charge of the National Parks of Canada, which, in addition to affording complete protection for some of the finest scenic wonders of the Dominion, also serve as sanctuaries for wild life.

The protection of the wild life of Canada is of national importance, and so the Dominion authorities have sought to coördinate all efforts toward wild-life conservation, whether these fell within Provincial or Dominion jurisdiction. One of the principal means of forwarding this unification of effort has been the practice in vogue for the last ten years or so of calling conferences of Provincial and Dominion Game officials. These conferences have been under the auspices of the Department of the Interior, and the Department has defrayed the expenses incurred by Provincial administrations in sending representatives to these conferences. The agenda for each

[1]Read at the joint meeting of the Northeastern Bird-Banding Association and the Federation of the Bird Clubs of New England, held at Boston, Massachusetts, January 16, 1931.

conference has included practically all the field of conservation, and since the proceedings were entirely confidential, each representative felt himself at liberty to discuss problems of the time freely and frankly. After long experience with these conferences it has been evident that small difficulties which had become magnified through slight misunderstandings rapidly disappeared when they were discussed before a gathering of this kind. Interspersed through the programme of these conferences have been papers and addresses by specialists on various subjects relating to conservation, and these have opened up new thoughts and served as focus points for discussions. A good many of these formal presentations to the conferences have been made public from time to time.

Before discussions which led to the Migratory Bird Treaty received the approval of the Dominion authorities, each of the Provinces of Canada was consulted, and practically unanimous agreement respecting the Treaty was reached before it was ratified. The understanding with the Provinces in connection with the administration of the Treaty was that each Province would amend its own game laws to conform with it, and enforce the Treaty in enforcing Provincial law. This was done to avoid duplication of staffs as between Provinces and the Dominion. In most parts of Canada this understanding is still in effect, although in some sections where the Provincial law is not yet in conformity with the Treaty a Dominion staff is employed. In addition, the Dominion has helped by patrols in remote sections, such as the north shore of the Gulf of St. Lawrence, and all officers and men of the Royal Canadian Mounted Police are empowered to enforce the Migratory Bird Treaty and the law based upon it throughout Canada.

Perhaps the greatest progress to be noted in bird-protection is the result of increased knowledge of birds. A few years ago it was difficult, if not impossible, to ascertain even the names of the common birds. I know one Canadian naturalist who as a young man named all the common birds of his vicinity with names that he had invented himself. Taverner's two bird books—"Birds of Eastern Canada" and "Birds of Western Canada"—have probably done more than any other single factor in spreading a knowledge of the bird-life of Canada throughout our country. Of course every other possible means of publicity has been employed to tell about birds and the need for their protection. Through lectures thousands and tens of thousands of people have been reached. One of the most interesting endeavors along this line has been the effort to reach camps of young people and tell them in the

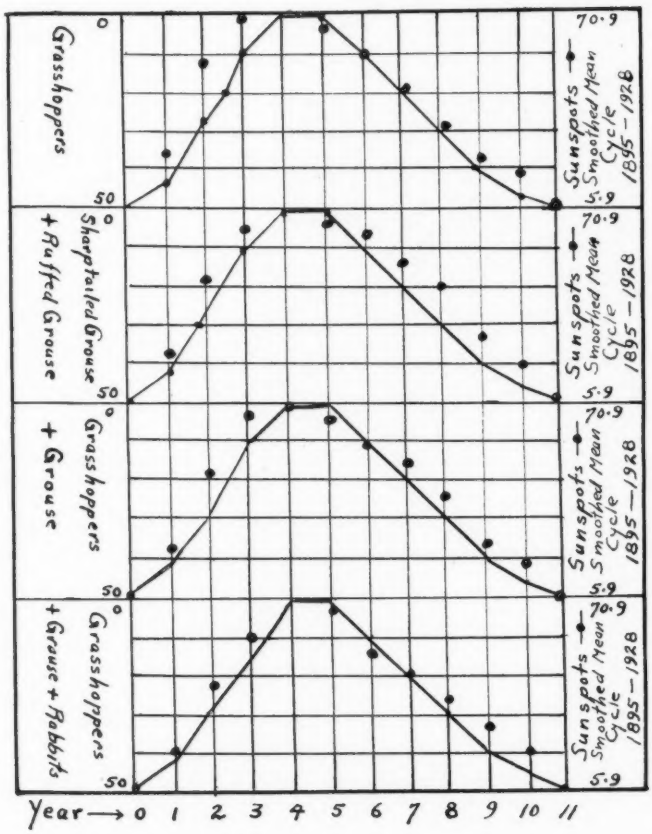


FIGURE 1

Chart prepared by Dr. R. E. DeLury, Dominion Observatory, Ottawa, showing relationship between sunspots and the Criddle statistics on fluctuations in Grouse, Grasshoppers and Rabbits. Faunal variations were recorded by Norman Criddle at Aweme, Manitoba, 1896–1929 and published in *The Canadian Field-Naturalist*, Vol. XLIV, No. 4, April 1930.

For Dr. DeLury's comment *vide* C. F. N. XLIV, No. 5, May 1930.

out-of-doors about wild life and its conservation. The effect of all the publicity work done in the United States has had an appreciable influence on Canadian thought in this connection. I am reminded of how closely we are bound together these days in publicity about conservation when I remember sitting by my own fireside and hearing Thornton W. Burgess speaking from Springfield, Massachusetts, and telling about how tame the deer were in the town of Banff, which is located in one of the western National Parks of Canada.

From time to time we have been face to face with plausible fallacies which interfered with conservation work, and every effort has been made to remove these fallacies. One example will suffice. It was generally believed a short time ago that if the ducks which breed in the southern part of the Provinces of Manitoba, Saskatchewan, and Alberta should be very largely replaced by the invasion of agriculture in that area, they would merely retreat to some mysterious northern fastness to breed. The study of the breeding-ranges for all of the ducks of Canada in the records of our National Museum showed that most of the northern parts of Canada were beyond the breeding-range of those species in which the hunter was interested. There were no northern fastnesses to which most of the prairie-nesting ducks could be expected to retreat, but the areas which are most suited for agriculture on the prairies of Canada are also the areas which are most suited for duck-production. Prairie-bred ducks may not be of great significance to the naturalists and hunters of New England, but they are of interest to almost every one else in the United States except in the extreme northeast, and to almost everyone in Canada, except those in the Maritime Provinces.

A new line of research has been suggested by the unfortunate coincidence that ducks prefer the prairies as a breeding-ground. Dr. Harrison F. Lewis, of the Department, is engaged in investigating the actual and potential value as a duck-producing area of the Pre-Cambrian shield which forms the geological backbone of North America and is largely within the confines of Canada. Large areas of the Pre-Cambrian, although relatively wild and unsettled and although provided with abundance of water, produce very few waterfowl, because of the lack of suitable foods. This lack is in part due to extreme erosion resulting from the last, or Labradorian, glaciation, which removed residual soils and is so recent that many suitable duck-foods, such as various potamogetons, *Lemna*, and *Vallisneria* have hardly had sufficient time since its close to immigrate into the glaciated

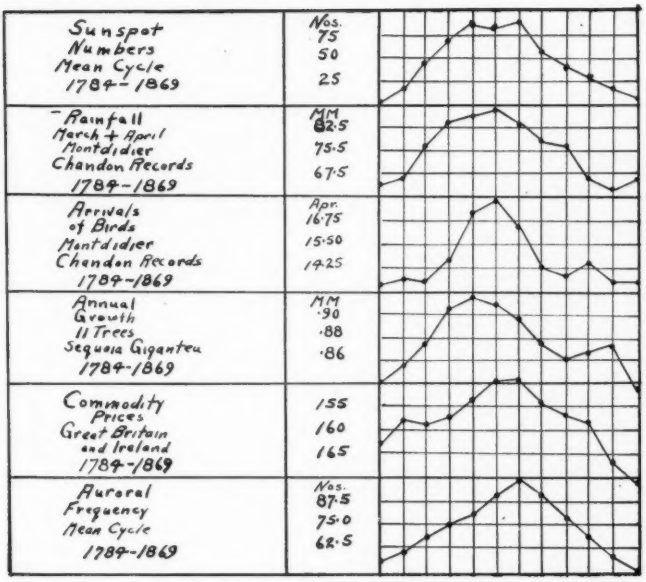

Sunspot Numbers Mean Cycle 1784-1869
Nos. 75 50 25
Rainfall March + April Montdidier Chandon Records 1784-1869
MM 82·5 75·5 67·5
Arrivals of Birds Montdidier Chandon Records 1784-1869
Apr. 16·75 15·50 14·25
Annual Growth 11 Trees Sequoia Gigantea 1784-1869
MM ·90 ·88 ·86
Commodity Prices Great Britain and Ireland 1784-1869
155 160 165
Auroral Frequency Mean Cycle 1784-1869
Nos. 87·5 75·0 62·5

FIGURE 2

Chart of the 11 year Sun spot cycle—1784–1869, with charts for the same period of Montdidier (France) rainfall, Montdidier dates of arrival of birds, tree-growths (sequoias, California), commodity prices in Great Britain and Ireland, and Aurora Borealis. Sun spots and the weather—Journal Royal Astronomical Society of Canada, Vol. XIX, pp. 293–298, 1925, Courtesy Dominion Observatory, Ottawa.

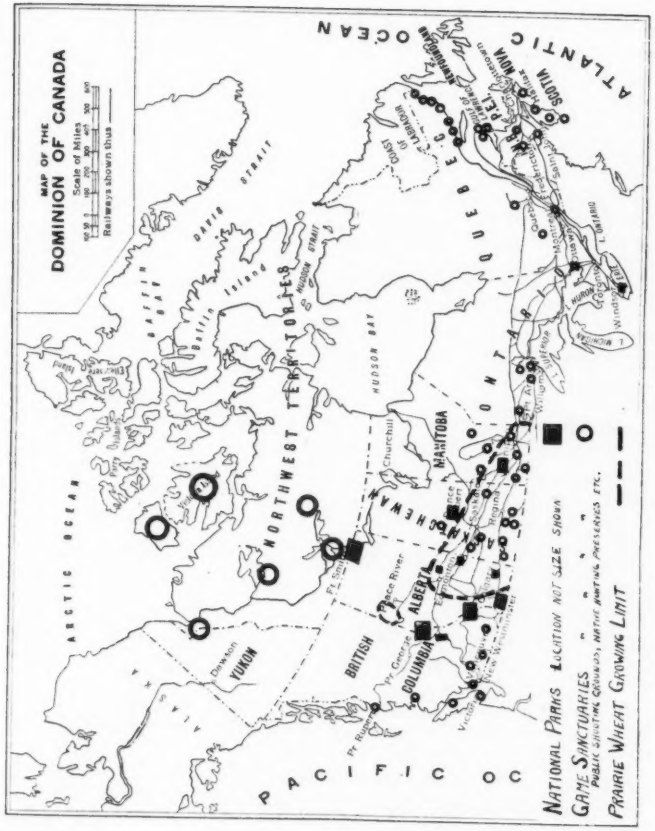
country. It is also due in part to the acidic nature of much of the granite, diorite, gneiss, and other plutonic rocks which make up the country rock over large parts of the region and whose influence, when not counteracted by other factors, causes acidic soils and waters inimical to many of the best duck-foods, which are calciphiles. Nevertheless, there are large areas of the Pre-Cambrian which produce a good many ducks, and, by proper introduction of duck-foods, may be made to produce more. They consist of:

(1) Areas covered with varved clays, more or less calciferous, laid down as lacustrine deposits or marine deposits, either on the bottoms of great glacial lakes, such as Lake Agassiz and Lake Barlow, or in arms of the sea, such as the Champlain Sea and Gilbert Gulf, during periods of post-glacial submergence.

(2) Areas covered with Pre-Cambrian or Palæozoic calciferous series, of either sedimentary or volcanic origin, or with glacial drift originating from such areas. Pre-Cambrian series involved include Beltian, Huronian, Timiskaming, Keewatin, and other strata, which, although they form a relatively small proportion of the superficies of the shield, are sufficiently large and widely scattered to be actually of great importance.

Introduction of calcicolous duck-foods on such areas and of oxylophytic duck-foods on the acidic areas, with possible transplantation of duck species if thought advisable, may be found practicable on a large scale and so cause a marked recuperation of the North American supply of wild ducks. Since, however, the huge area involved has never before been studied from this point of view, and the work is entirely new, involving the coördination of several sciences, namely Ornithology, Botany, Geology, and Chemistry, great rapidity of development must not be looked for.

Variation in water-supply in the shallow prairie lakes was found to be a very important factor in the production of ducks. The officers of the Department concerned with wild life and those of the Department in the Dominion Observatory have been coöperating to study these variations and some truly remarkable relationships have been found connecting variations in the sun with variations in living things. Perhaps the most striking of these are based upon natural-history observations of Mr. Norman Criddle, who has kept definite wild-life records at Aweme, Manitoba, for about forty years. These are shown in a chart. Variations in the sun are also found to cause variations in rainfall, and cycles of moist and dry years result. Thus, while it may not be possible to control


MAP OF THE
DOMINION OF CANADA
Scale of Miles
Railways shown thus
ARCTIC OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
NORTHWEST TERRITORIES
YUKON
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NOVA SCOTIA
NEWFOUNDLAND
HUDSON BAY
DAVIS STRAIT
BAFFIN ISLAND
Churchill
Peace River
Dawson
Victoria
Vancouver
Ottawa
Toronto
Montreal
Quebec
Halifax
St. John
Winnipeg
Regina
Edmonton
Calgary
NATIONAL PARKS LOCATION NOT SIZE SHOWN
GAME SANCTUARIES
PUBLIC SHOOTING GROUNDS, MIGRATORY BIRDS PRESERVES ETC.
PRAIRIE WHEAT GROWING LIMIT

the moisture-supply for these important shallow lakes, it may at least prove possible to foretell the probable duck-supply from year to year, and plan for its conservation with more foresight than is possible at present. One of the most valuable methods of reaching the particular phase of the cycle of moist and dry years for any locality is afforded by a study of tree-sections for that locality, and the Dominion Observatory is now analyzing tree-sections from many parts of Canada with this end in view.

There are many people that are not convinced that wild life is of sufficient economic importance to be worth bothering about. To meet this frame of mind we have prepared very definite statistics, showing that the wild birds, wild mammals, and sporting fish of Canada have an annual value of approximately $50,000,000. A business of this size is one the capital of which is worth $1,000,000,000. The details are being published and will be available shortly[1]. The value of birds as insect-destroyers is not included.

In more purely ornithological lines some advances in scientific research have been made, and there is an increasing interest in the need for scientific answers to puzzling problems. It was Mr. J. A. Munro, Chief Western Officer under the Migratory Bird Treaty, who pointed out some years ago that the cause of duck sickness in Western lakes was probably bacterial in origin, and this seems to be confirmed by the latest findings of the Biological Survey that this mysterious and fatal malady was botulism.

Important studies of the Double-crested Cormorant have been made in Canada by Messrs. Munro and Lewis, and the latter found that, apparently, this species, which is often accused of eating salmon and trout, had an abhorrence for such food.

Those of you who attended the A. O. U. meeting at Salem will remember that Dr. Lewis presented statistical information to show that the Bird Sanctuaries established for the protection of sea-birds on the north shore of the Gulf of St. Lawrence in Quebec really were functioning in the way that it was expected they should. Mr. Munro has been providing new and interesting material on the relation of birds to fisheries. The evidence gathered in these various particulars is especially

[1]The Cash Value of the Wild Life of Canada. By Harrison F. Lewis. Proceedings 24th Convention International Association of Game, Fish and Conservation Commission, 1930. Secretary-Treasurer, R. P. Holland, 578 Madison Avenue, New York.

useful, because birds have often been accused of causing damage for which they were not really responsibile, or the bird damage has been limited and they have been blamed for far more than they have caused. If all birds which were found doing any damage whatever to man's interest were destroyed, it is feared that we should soon have eliminated much of the fascinating avifauna of North America. Along this line one of the most interesting attacks on birds developed recently. Geese and Brant were accused of damaging commercial eel-grass beds. Careful investigation showed, however, that the damage to these beds was caused by too frequent cutting by man, and not by the birds. Although the birds were charged with the damage, the investigation of this problem proved to be more botanical than ornithological.

The idea of bird sanctuaries in Canada is a very old one. It was in 1887 that the first sanctuary was formally set aside by the Department of the Interior at Last Mountain Lake in the Province of Saskatchewan. A glance at the map will show that the idea has spread, and it has certainly proved to be one of the finest means of saving some of the original inhabitants of North America for posterity. Although a very considerable number of these Western sanctuaries were transferred to the respective Provinces during the past year by what really amounted to an amendment of the constitution of Canada, the transfer agreement contains the following clause:

"The Provinces will further continue and preserve as such the bird sanctuaries and public shooting grounds which have been already established and will set aside such additional bird sanctuaries and public shooting grounds as may hereafter be established by agreement between the Minister of the Interior and the Provincial Secretary or such other Minister of the Province as may be specified under the laws thereof."

The birds were not forgotten in this very important constitutional change in Canada. In all the work of our Department in wild-life matters we have enjoyed the fullest help from the Biological Survey at Washington; particularly in the gathering of waterfowl statistics and in the securing of information about birds through the banding method has this been in effective operation. This is deeply appreciated, and I assure you that the Department of the Interior, on its part, tries to help in any way possible the administrative branches concerned with

wild-life conservation in the United States[1]. Action for the conservation of birds must be based on fact. In learning the truth of birds' travel, the vital statistics of birds, the need for more protection, or even the fact that protection for any species may be relaxed, the bird-bander has an important part to play. He is searching out the truth about birds, and on the knowledge gained by him and by other workers in ornithology a sound structure of conservation may be built. I think all bird-banders become conservationists even if all conservationists do not become bird-banders.

The future of conservation cannot be regarded entirely with equanimity. There is a general expansion of agriculture which is bound ultimately to occupy all the suitable lands of Canada and some which are not now considered suitable. This expansion exerts pressure upon wild life. The new methods of travel, particularly the aeroplane, have hastened the rate of transport in wilderness areas more even than in other places. It is a fair estimate to allow hours instead of weeks for aeroplane travel in northern Canada now. When it is remembered that hunters may be transported by aeroplane, the threat against wild life made by the aeroplane resolves itself into the fact that there is very little wilderness left. The situation is being frankly discussed with the air pilots of Canada, and without doubt this new danger to game can be overcome, at least in part. Transportation again affects game and former wilderness areas in the matter of railways extending their lines northward in Canada. The railway line from The Pas, Manitoba, to Churchill, Manitoba, is nearing completion. The railway line from Cochrane, Ontario, to Moose Factory Ontario, is at present completed so far north that it is only a

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[1] Commissioner J. B. Harkin of the Department of National Parks of Canada, kindly compiled for me the number of areas in the Dominion which have been set aside and classified as Public Shooting Grounds, Bird Sanctuaries, National and Provincial Parks, Native Hunting Preserves, Game Refuges, Forest Reserves, etc. These are all in varying degree bird sanctuaries. The data on the areas of Provincial Reservations are not complete, but it seems desirable to sum up in tabular form the number and known area of the tracts, as follows:

Name of Area	*Number*	*Area in Square Miles*
Public Shooting Grounds	52	703.9
Bird Sanctuaries	29	46.
National Parks	16	12,059.
Native Hunting Grounds (Northwest Territories)	5	529,557.
Provincial Game Preserves (26 are also bird sanctuaries)	61	12,479.
Provincial Game Refuges	3	20,615.
Forest Reserves, Provincial Parks and Crown Game Preserves.	55	31,765.
Totals	221	587,112.9

EDITOR.

few miles from the end of steel to tidewater. Churchill is not particularly a duck or waterfowl area so far as known at present, but James Bay is a concentration point for geese, and perhaps for ducks to a more limited extent, and steps are under way to have conservation measures adapted to the new conditions which can be expected shortly.

Lead poisoning seems to be one of the most hopeless of the dangers to waterfowl. The cumulative effect of adding lead year after year to waterfowl marshes is bound to be serious. One of the worst results of lead poisoning, because it seems so unnecessary an accident and such a misfortune although impossible to prevent, was the poisoning in Canada of a considerable number of Trumpeter Swans in this way.

It will probably be found essential to increase restriction of hunting or to stop it entirely for species that are restricted by nature to limited, or very special habitats, whether on their breeding-grounds or on their wintering-areas. Safe breeding-range and safe wintering-range are essentials, and both countries will have to do their utmost in their respective fields to save sufficient areas of these.

One of the most dangerous world conditions affecting many kinds of birds, as you well know, is oil pollution of the sea occasioned by changes in shipping practices in the last few years. Canada has coöperated with the United States and other Maritime Powers ever since the problem became acute, but the final solution still seems to be a long way off.

Whether conservation can keep ahead of the multifarious destructive agencies is problematical. A satisfactory termination of the conservation work of our time depends on a more general awakening of the public, rather than on the interest of a comparatively few people who from one reason or another are intimately concerned. Education which will convince the public as a whole of the need for conservation, and of such a nature that it will get adequate results before the opportunity passes forever is the leading Canadian aim in conservation work.

RETURNS OF WINTERING BIRDS TO SUMMERVILLE, SOUTH CAROLINA

By WILLIAM P. WHARTON

INCREASING numbers of returns-W have characterized my fourth and fifth winter seasons at Summerville. Those of undoubted validity are of the White-throated Sparrow (*Zonotrichia albicollis*), the Towhee (Red-eyed) (*Pipilo e. erythrophthalmus*), the Savannah Sparrow (*Passerculus sandwichensis savanna*), and the Hermit Thrush (*Hylocichla guttata pallasi*). Forty-two returns of these species were taken in 1929 and forty-eight in 1930, as compared with twenty-nine in 1928. If to these figures be added retakings of the Chipping Sparrow (*Spizella p. passerina*), which, for reasons stated in my article in the January, 1929, number of the *Bulletin*, Vol. V, No. 1, pp. 26 and 27, and to be elaborated further on in this article, I am disposed to regard as overwhelmingly and perhaps wholly true returns, these totals will be raised to ninety-five and one hundred and twenty-two respectively.

The following table shows all returns of White-throated Sparrows taken in the two years under consideration, together with the previous history of each bird so far as it is known. It is worth mentioning that up to the present time not a single one of the 786 White-throats banded in the five winters from 1926 to 1930 inclusive has been reported from elsewhere:—

TABLE I

Band Number	*Date Banded*	*Returning Dates*			
	1926	*1927*	*1928*	*1929*	*1930*
44648	Jan. 11			Feb. 9	
181124	Mar. 2 *1927*	Feb. 3	Jan. 17	Jan. 18	Jan. 17
183807	Jan. 5			Jan. 29	Jan. 29
183811	Jan. 10		Mar. 9	Mar. 7	
473812	Feb. 7		Jan. 16	Jan. 15	
473833	Mar. 15				Jan. 30
473834	Mar. 16		Mar. 5		Feb. 4
473842	Mar. 21				Mar. 8
473846	Mar. 27		Jan. 9	Jan. 7	
494889	Apr. 26		Apr. 16	Feb. 23	

Band Number	*Date Banded*	*Returning Dates*			
		1927	*1929*	*1929*	*1930*
	1928				
494954	Jan. 2			Jan. 7	
494961	Jan. 3			Jan. 14	
494963	Jan. 3			Jan. 10	
494964	Jan. 3			Jan. 10	
494970	Jan. 4			Apr. 14	
494975	Jan. 7			Apr. 17	
494978	Jan. 7			Apr. 15	
494979	Jan. 8			Jan. 10	
494981	Jan. 10			Apr. 15	
494984	Jan. 14			Feb. 3(dead)	
494985	Jan. 16			Jan. 24	Jan. 31
609202	Jan. 16			Jan. 14	
609207	Jan. 21			Feb. 12	Jan. 19
609211	Jan. 22			Feb. 18	
609213	Jan. 23			Feb. 12	
609216	Jan. 24			Feb. 2	Mar. 11
609217	Jan. 28			Jan. 30	Jan. 21
609220	Jan. 28			Jan. 30	Jan. 19
609223	Jan. 28			Jan. 31	Jan. 20
609256	Mar. 4			Feb. 25	
609257	Mar. 5			Feb. 23	
609262	Mar. 7			Mar. 6	
609269	Mar. 12				Jan. 19
609270	Mar. 15				Feb. 5
609271	Mar. 15			Jan. 24	
609273	Mar. 16			Feb. 5	
609278	Mar. 21				Mar. 6
609281	Mar. 22			Jan. 24	
609283	Mar. 22			Jan. 27	
609292	Apr. 5			Apr. 6	
634005	Apr. 17				Jan. 15
634018	Apr. 25			Apr. 12	
	1929				
A120363	Feb. 24				Jan. 1
A120422	Apr. 10				Jan. 2
A120453	Apr. 16				Jan. 4
A120429	Apr. 12				Jan. 5
A120333	Feb. 11				Jan. 15
A106089	Jan. 14				Jan. 16
A120329	Feb. 9				Jan. 18
A106078	Jan. 9				Jan. 18
A120366	Feb. 15				Jan. 30
A120337	Feb. 11				Feb. 4
A120353	Feb. 19				Feb. 5
A120336	Feb. 11				Feb. 8
A120367	Feb. 25				Feb. 8
A106084	Jan. 12				Feb. 10
A120413	Mar. 29				Feb. 27
A120412	Mar. 28				Feb. 27
A120409	Mar. 29				Mar. 3
A120376	Mar. 8				Mar. 4
A120387	Mar. 16				Mar. 24
A120327	Feb. 8				Apr. 22

Of the thirty-five birds returning in 1929, two were banded in 1926, five were banded in 1927, and twenty-eight were banded in 1928. Of the thirty-five returning in 1930, one had been banded in 1926 (a return-4), four in 1927, ten in 1928, and twenty in 1929. Thus in 1929, 77.14 per cent of the total returns taken were birds banded the previous year, while in 1930 such birds were but 57.14 per cent of the total. In 1928 the percentage had been 77.77 per cent.

The following table shows numbers of the birds of this species banded each year which returned in subsequent years, with percentages calculated on the basis of the number originally banded. The starred figures are percentages of survival as indicated by these returns. They differ from the percentages of returns because birds which failed to be taken as returns for one or more years after banding, but which ultimately were retaken, are included as survivors during the intervening years:—

TABLE II

Year Banded	*Number Banded*	*Returning in*								*Total Number of Individuals Returning Out of Original Number Banded*	
		1927		*1928*		*1929*		*1930*			
1926	94	*11.70% 7 7.44%		*7.45% 6 6.38%		*2.13% 2 2.13%		*1.06% 1 1.06%		11	11.70%
1927	104			*23.08% 21 20.29%		*6.73% 5 4.81%		*3.85% 4 3.85%		24	23.08%
1928	145					*22.06% 28 19.31%		*6.89% 10 6.89%		32	22.06%
1929	169							20	11.80%	20	11.80%
1930	274										

It will be noticed that the percentages of survival of the second year after banding, during the three years when such figures are available, show a rather remarkable uniformity, ranging between 6.75 per cent and 7.50 per cent.

The following table shows returns of Chipping Sparrows taken in 1929 and 1930, together with the previous history of each bird, and in one case a bit of subsequent history:

TABLE III

Band Number	*Date Banded*	*Returning Dates*			
		1927	*1928*	*1929*	*1930*
	1926				
A57059	Mar. 26		Mar. 30	Feb. 28	Mar. 18
A57085	Mar. 28			Jan. 23	
A58757	Apr. 13			Mar. 3	
	1927				
A70250	Mar. 5			Jan. 23	
A83360	Mar. 9			Jan. 29	
A83361	Mar. 8			Jan. 29	
A88051	Mar. 29			Jan. 15	
A88088	Apr. 7				Feb. 20
	1928				
B18633	Jan. 15			Feb. 28	Feb. 27
B18637	Jan. 17			Jan. 23	Jan. 26
B18680	Feb. 11				Apr. 10
B18692	Feb. 27			Mar. 2	
B18696	Feb. 27			Jan. 28	
B18700	Feb. 28			Jan. 29	
B23005	Feb. 28				Feb. 21
B23014	Mar. 1			Apr. 5	
B23016	Mar. 1			Mar. 2	Mar. 1
B23017	Mar. 2			Mar. 2	
B23033	Mar. 7			Jan. 28	
B23035	Mar. 7				Feb. 21
B23057	Mar. 8				Feb. 21
B23044	Mar. 7			Apr. 2	Mar. 18
B23055	Mar. 8			Mar. 3	Feb. 23
B23072	Mar. 14			Feb. 23	
B23093	Mar. 19				Mar. 23
B23074	Mar. 14			Apr. 9	
B23079	Mar. 18				Feb. 20
B23099	Mar. 19				Feb. 24
B36003	Mar. 19			Mar. 26	
B36007	Mar. 19			Jan. 28	Feb. 16
B36017	Mar. 19			Mar. 11	Mar. 16
B36023	Mar. 19				Feb. 28
B36025	Mar. 19			Jan. 28	
B36026	Mar. 19			Mar. 2	
B36031	Mar. 19			Mar. 3	Mar. 1
B36058	Mar. 20			Mar. 19	
B36065	Mar. 22			Jan. 29	
B36067	Mar. 22				Feb. 25
B36083	Mar. 22			Mar. 3	Mar. 7
B36087	Mar. 22			Mar. 16	
B36089	Mar. 22			Mar. 2	Mar. 18
B36093	Mar. 22			Jan. 15	
B37003	Mar. 23			Mar. 29	
B37004	Mar. 23			Feb. 25	
B37010	Mar. 23			Jan. 23	
B37007	Mar. 23			Jan. 23	
B37015	Mar. 23			Mar. 1	Feb. 18
B37017	Mar. 23			Mar. 1	
B37020	Mar. 23				Mar. 18

Band Number	*Date Banded*	*Returning Dates*			
		1927	*1928*	*1929*	*1930*
	1928				
B37038	Mar. 27			Mar. 18	Mar. 14
B37042	Mar. 28			Mar. 17	Mar. 27
B37044	Mar. 28			Mar. 11	
B37051	Mar. 28			Apr. 11	
B37056	Mar. 28			Mar. 16	
B37060	Mar. 28			Mar. 11	
B37061	Mar. 28				Mar. 15 (killed)
B37079	Apr. 1			Mar. 9	Feb. 28
B37080	Apr. 1			Feb. 13	Feb. 27
B37081	Apr. 1			Feb. 14	Feb. 27
B37085[1]	Apr. 1			Mar. 9	Mar. 20
B37503	Apr. 4			Mar. 3	Feb. 25
B37513	Apr. 9			Mar. 31	Feb. 18
B37523	Apr. 12			Mar. 7	
B37524	Apr. 12			Mar. 25	
B37537	Apr. 14			Mar. 9	
	1929				
B73535	Feb. 18				Feb. 10
B73541	Feb. 23				Feb. 11
B73533	Feb. 17				Feb. 11
B66986	Jan. 28				Feb. 11 (dead)
B66987	Jan. 28				Feb. 11
B73676	Mar. 6				Feb. 16
B73540	Feb. 28				Feb. 16
B66985	Jan. 28				Feb. 16
B73556	Feb. 25				Feb. 20
37874	Apr. 8				Feb. 21
B73593	Feb. 28				Feb. 21
37857	Mar. 31				Feb. 22
B73678	Mar. 6				Feb. 25
B66975	Jan. 23				Feb. 25 (dead)
B73571	Feb. 25				Feb. 26
37784	Mar. 17				Feb. 27
B73618	Mar. 2				Feb. 27
B73547	Feb. 25				Feb. 28
37849	Mar. 29				Mar. 1
B73566	Feb. 25				Mar. 1
37877	Apr. 10				Mar. 1
37753	Mar. 9				Mar. 2
37851	Mar. 29				Mar. 2
B73525	Feb. 13				Mar. 2
B73680	Mar. 6				Mar. 2
B66991	Mar. 28				Mar. 5
37879	Apr. 11				Mar. 1
B73598	Mar. 1				Mar. 2
B73552	Feb. 25				Mar. 12
37793	Mar. 17				Mar. 12
B73550	Feb. 25				Mar. 13
B73592	Feb. 28				Mar. 18
37831	Mar. 26				Mar. 18

[1]Found dead at St. Johnsbury, Vermont, May 27, 1930.

Band Number	*Date Banded 1929*	*Returning Dates*			
		1927	*1928*	*1929*	*1930*
37801	Mar. 18				Mar. 17
B73647	Mar. 3				Mar. 20
37861	Apr. 2				Mar. 23
37807	Mar. 19				Mar. 26
B66996	Jan. 29				Mar. 26
37786	Mar. 17				Mar. 27
37843	Mar. 29				Mar. 27
37842	Mar. 29				Mar. 31
B73693	Mar. 9				Mar. 31

The taking of B37085 at St. Johnsbury, Vermont, on May 27, 1930, after this bird had returned two successive seasons subsequent to banding, is an important piece of evidence tending to support my belief expressed in a previous article that the flocks of Chipping Sparrows found at Summerville in winter and in early spring are practically wholly winter residents in the South. Mr. Alexander Sprunt, of the Charleston Museum, tells me that he has never found this species nesting in the coastal plain section of South Carolina. It is on record, however, that Arthur T. Wayne found one nest of the Chipping Sparrow in his long experience in the "low country" in this state, and found parents feeding young in another instance. In support of Wayne's observations, I had an experience of my own on April 27, 1930. While walking across the golf course I noticed two birds of this species, probably mated, and saw one gather dried rootlets from an upturned sod and fly with them to a near-by pine tree. At the time I noted that neither bird was banded. Unable further to investigate, I notified a resident of Summerville who is a keen bird-student, and subsequently she saw the birds feeding young in the nest, and confirmed my observation that neither was banded. I may remark parenthetically that although I saw moderate flocks of Chipping Sparrows on the course a few days prior to my departure, I could distinguish none which carried bands. This was of interest in that I had banded considerable numbers in this section up to April 14th.[2] From the foregoing facts and observations I am strongly inclined to believe that the birds wintering in Summerville have probably practically all left by May 1st, and that birds from farther south are the later

[2]Information more recently received from a practicing doctor in Sumerville, who as a young man about twenty years ago made a collection of birds' eggs and nests, indicates that the Chipping Sparrows nested there at that time occasionally. He tells me that he remembers at least three nests which came under his observation during the few years he was active in collecting.

migrants and supply from their ranks, before passing farther north, such local nesters as may be found in that region later in the spring. This belief is borne out by the practical disappearance of this species during the last days of April from the feeding-stations in the residential sections of the town, where it has been plentifully represented during the winter and early spring months, which I am assured by competent observers is the case. It is further borne out by the progressive decrease of repeats taken during April. Thus of the fifty-three returns taken in 1929, nine repeated after March 31st, and only four after April 10th. (I left Summerville on April 20th of that year.) Of the seventy-three returns taken in 1930, thirty-three repeated after March 31st, but only seven after April 20th. (I left Summerville on April 27th in 1930.) Of three hundred and twenty-three new banded birds in 1929, twenty-eight repeated after March 31st, and fourteen after April 10th. Of two hundred and fifty-five banded in 1930, forty-two repeated after March 31st, and only fourteen after April 20th. Some of this falling off may have been due to the fact that the birds did not come as freely to the bait after warm weather set in, but to any careful observer the marked diminution in the numbers of the species present would appear to have been the chief reason. The following table shows the repeats of newly banded Chipping Sparrows by months in 1929 and 1930:

TABLE IV

Month	*Total Number Banded*	*Total Number Repeating*	*Number Repeating After March 31*	*Number Repeating After April 20*	*Number That Did Not Repeat*	
			1929			
January	37	13	0	0	24	64.86%
February	73	46	3	2	27	37.00%
March	196	80	19	10	117	59.28%
April	17	6		2	11	64.70%
Totals	323	145	22	14	179	55.42%
			1930			
January	2	0	0	0	2	100.00%
February	34	20	8	1	14	41.17%
March	141	80	34	6	61	43.26%
April	78	31		6	47	60.25%
Totals	255	131	42	13	124	48.63%

The gradual increase in percentages of non-repeating birds in those banded in February, March, and April is what might

be expected from the gradually increasing rapidity of the migratory movement during those months. The large percentage of non-repeaters in January-banded birds is less easy to account for, but may be due to the difficulty in trapping this species during that month, as indicated by the small numbers banded.

Table V shows returning and survival ratios of Chipping Sparrows for the whole five-year period of my banding operations at Summerville, being constructed exactly like that giving similar data regarding White-throats (Table II). (Starred figures show survival ratios.) In comparison with the latter, it will be noted that the percentages average considerably lower.

TABLE V

Year Banded	*Number Banded*	*Returning in*								*Total Number of Individuals Returning Out of Original Number Banded*	
		1927		*1928*		*1929*		*1930*			
1926	191	*8.09%	10 5.23%	*4.18%	6 *3.14%	*1.57%	3 1.57%	*0.523%	1 0.523%	17	8.9%
1927	167			*5.98%	6 3.59%	*2.39%	4 2.39%		0	10	5.98%
1928	313					*18.21%	46 14.7%	*9.58%	30 9.58%	57	18.21%
1929	232							*18.10%	42 18.10%	42	18.10%
1930	255										

Table VI gives the history of the Towhees returning in the two years under consideration. A striking feature of this record is the fact that of the eight returns taken in 1929, not one returned in 1930, and that the three taken in the latter year which had been banded in 1927 and 1928 had never returned before. Inasmuch as practically the same ground was trapped over each year, and birds were almost always retaken in the same general localities as those in which they were banded, it would naturally be expected that a few of the same birds would be taken at least two different years as returns. It is not improbable, however, that the figures are the result of chance rather than of an actual movement of the birds to other localities.

TABLE VI

Band Number	*Date Banded*	*Returning Dates*		
		1928	*1929*	*1930*
	1927			
330060	Jan. 30			Jan. 19
330059	Jan. 30		Jan. 9 (dead)	
	1928			
474851	Jan. 2			Feb. 8
474852	Jan. 2			Jan. 4
474859	Jan. 4		Jan. 9	
474870	Jan. 21		Jan. 30	
582852	Jan. 31		Jan. 26	
582860	Feb. 5		Feb. 6	
582866	Feb. 10		Jan. 26	
582884	Mar. 9		Jan. 31	
582901	Apr. 21		Jan. 11	
	1929			
582914	Jan. 19			Jan. 15
582923	Jan. 25			Jan. 18
A203912	Feb. 2			Jan. 23
582916	Jan. 22			Jan. 27
582917	Jan. 22			Feb. 6
A203927	Mar. 10			Mar. 16
A203934	Mar. 26			Mar. 29

Table VII, giving returning and survival ratios of Towhees during the entire five year period, seems to indicate a survival percentage of this species somewhat similar to that of the White-throats.

TABLE VII

Year Banded	*Number Banded*	*Returning in*				*Total Number of Individuals Returning Out of Original Number Banded*	
		1927	*1928*	*1929*	*1930*		
1926	18	0 *5.50% 0%	1 *5.50% 5.50%			1	5.50%
1927	13		1 *23.08% 7.69%	1 *15.38% 7.69%	1 *7.69% 7.69%	3	23.07%
1928	36			7 *25.00% 19.44%	2 *5.55% 5.55%	9	25.00%
1929	34				7 *20.59% 20.59%	7	20.59%
1930	65						

As mentioned in a previous article, a few Savannah Sparrows and Hermit Thrushes had been taken as returns up to 1929. During 1930, two Savannahs and one Hermit return were taken. In the case of Savannah Sparrow A57001, which was banded in 1926, and which had returned in 1927, a period of two years elapsed before its reappearance in the traps. This bird was retaken on April 4, 1930, being then not less than four and three quarters years old.

In spite of the fact that eighty-three Juncos were banded during the first four years, no returns of this species have ever been taken. Once a banded bird was seen at the beginning of the season before any Juncos had been banded, but, though it was in all probability a return, this bird refused to yield to the temptation to reënter the traps which were offered it. This failure to take Junco returns is rather remarkable in view of the many which have been taken by Fletcher and others who have stations in Junco wintering territory farther north.

The species thus far taken as true returns are: White-throated Sparrow, Savannah Sparrow, Towhee, Hermit Thrush, Chipping Sparrow, and (presumably in part) Field Sparrow. To these, in 1931 up to present writing, have been added the Song Sparrow, Vesper Sparrow, Myrtle Warbler, Ruby-crowned Kinglet, and Catbird; also one Junco (after the writing of the preceding paragraph).

Brown Thrashers, Blue Jays, White-eyed Towhees, Cardinals, Tufted Titmouses, and Mockingbirds have been retaken in various seasons subsequent to their banding, but since these species are all abundant permanent residents, and probably in the main are purely sedentary, all such individuals should probably be considered as repeats rather than as true returns. To this list, in 1931, have been added the Meadowlark and Bob-white.

GENERAL NOTES

Another Banded European Widgeon.—The Biological Survey has received a communication from A. J. Tipler, of St. Petersburg, Florida, reporting that while hunting ducks on Currituck Sound, North Carolina, in December, 1930, he killed a female widegon that carried a band inscribed P. Skovgaard, Viborg, Danmark, V6202. The case was reported to Mr. Skovgaard, who has advised that this bird was banded at Litla Arsskogssandi, Iceland, on July 12, 1930.

In his communication supplying the banding data, Mr. Skovgaard stated that his coöperator reported that this bird was an "Urt" (teal), but since other ducks banded in Iceland and recovered in North America have been European Widgeons, and since Mr. Tipler called it a widgeon, he is convinced that it was erroneously identified at the time of banding.—FREDERICK C. LINCOLN, Biological Survey.

New Fairfield, Connecticut, Tree Sparrow Returns-W.—As the number of returning birds banded in any given year affords data on the persistence with which a species comes back to its nesting or wintering place, and, to a degree are a measure of its longevity, it seems desirable to place on record the known history of sixteen Tree Sparrows (*Spizella m. monticola*) banded at New Fairfield, Connecticut, by Mrs. Albert G. Mathers during the winter season of 1929–30, as supplementary to similar data for this species already published. In th *Bulletin of the Northeastern Bird-Banding Association*, Vol. II, 1926, pp. 28–31, Don V. Messer published the known history of fifteen Tree Sparrows banded between February 3 and 25, 1925, at Huntington, Massachusetts. Of these fifteen birds none was taken as a return in the season of 1925–26, probably owing to the fact that natural food was abundant on account of a nearly open winter. During the season of 1926–27, however, eight of the birds returned to his station and one to a station some fifteen hundred feet distant, showing a returning ratio of 53.33 per cent and a survival ratio of 60 per cent, the birds being then at least two and a half years old.

In the *Bulletin*, Vol. III, pp. 37–39, 1927, Mrs. Sadie B. Knox reported banding at her station in Westfield, Massachusetts, thirteen Tree Sparrows during November, 1925. Of these eleven returned to the immediate area in 1926 (ten to the same station where banded, the eleventh bird being trapped some half-mile distant), a returning and survival ratio of 84.61 per cent when the birds were at least one and a half years old. This is the highest returning ratio for this species yet reported. It is important to note that the eleven returns were banded between November 1st and November 18th, 1925, and that eight of the returns of the following winter were recaptured during November, suggesting that the original flock of thirteen birds constituted a migratory unit.

Mrs. Mather's data on this species are of a similar order. Of eight birds banded during the winter season of 1928–29, five returned the second winter season, or 43.50 per cent. A second season's banding (1929–30) of sixteen Tree Sparrows yielded eight returns in the season of 1930–31, or 50 per cent. The available data on this species show a very strong tendency to winter in the same place year after year, and also a high survival ratio. It is regrettable that we have no knowledge of the ages or sexes of the birds under consideration.—C. L. WHITTLE.

An Old Female Cowbird Recovery.—On May 5, 1925, I banded a female Cowbird (*Molothrus ater ater*) at my station in Belchertown, Massachusetts. A recent note from the Bureau of Biological Survey reports this bird as having been killed by Mr. Jenkins in Charleston County, South Carolina, February 2, 1931. The bird when killed was at least seven years old.—E. G. Rowland, State Hospital, Norwich, Connecticut.

More Snow Bunting Returns-W.—In *Bird-Banding* for October 1930, pp. 187 and 188, I gave the list of my returns of Snow Buntings (*Plectrophenax nivalis nivalis*) up to that time. So far this winter season (1930–31), I have had eleven more returns, among them being No. B80242, which was taken as a Return-2W. In a table given below, I am giving all of my returns of this species up to the present time, and also the single recovery, No. B80267, arranged chronologically:

Band Number	*Date Banded*	*Date Retaken*
B80242	February 8, 1929	December 25, 1929
B80242	February 8, 1929	January 3, 1931 (Return -2)
B80230	February 9, 1929	January 31, 1931
B80266	February 22, 1929	March 12, 1930
B80267	February 23, 1929	April 18, 1929 at Chelmsford, Ontario
B80268	February 24, 1929	March 6, 1931
B80269	February 25, 1929	March 12, 1930
B80275	February 28, 1929	January 21, 1931
C14873	December 22, 1929	January 19, 1931
C14874	December 23, 1929	January 28, 1931
C14880	January 25, 1930	January 23, 1931
C14889	February 14, 1930	January 9, 1931
C14891	February 14, 1930	January 8, 1931
C14895	March 1, 1930	February 11, 1931
C51204	March 6, 1930	January 31, 1931

Oscar McKinley Bryens, McMillan, Luce County, Michigan.

Fox Sparrow Recoveries and Returns. — Fox Sparrows (*Passerella i. iliaca*), so far as I know, have not been banded thus far on their nesting-grounds. There are, however, two available records of two birds of this race, one banded while in migration to its summering-grounds in the North, and the other while on its wintering-grounds in the South. F. C. Lincoln (see Technical Bulletin No. 32 of the United States Department of Agriculture, p. 73) records one of this race banded at Demarest, New Jersey, No. 47587, April 2, 1924, and recovered January 26, 1926, at Pinetown, North Carolina. In the meantime it had made five complete migrations, three to its wintering-grounds and two to its summering (nesting) grounds.

A more recent recovery is that of Fox Sparrow 694523, banded by R. R. Marsden of Hanover, New Hampshire, April 5, 1929, and found dead strangely enough at the same place, Pinetown, North Carolina, by C. Keetch, January 20, 1931.

Lincoln (*loc. cit.*), however, records one return Fox Sparrow from Cedar Hill, British Columbia, eleven from Berkeley, California, and one from Los Angeles, California. None of these thirteen birds was taken on its nesting-grounds, so that from the published records we do not know whether the Fox Sparrows were of one or several recognized sub-species, seven of which nest in California according to Swarth[1], or were some of

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[1] "Revision of the Avian Genus Passerella with Special Reference to the Distribution and Migration of the Races in California," by H. S. Swarth, *University of California Publications in Zoölogy*, Vol. 2, No. 4, Sept. 11, 1920.

the nine additional races nesting north of California. As all but three of the Passerella returns reported by Lincoln were made at Berkeley, these were doubtless returns to wintering quarters.

Swarth (*loc. cit.*) says (p. 112) that only by extensive collecting of wintering Passerella can the wintering homes of the California races be definitely determined. In place of collecting, well-ordered stations for trapping and banding of the birds will assist in securing the desired data as well as additional scientific information relating to Passerella and other species without the attendant sacrifice of bird-life of the collecting method. —C. L. WHITTLE.

Common Cormorant Return to Natal Colony.—Mr. Charles L. Whittle has informed me by letter that the report of a capture in Minnesota of a Common Cormorant banded in Holland, published in *Der Vogelzug*, Vol. I, No. 3, July, 1930, has been declared by Fr. Haverschmidt, in a later issue of the same publication (*Der Vogelzug*, Vol. II, No. 1, pp. 42–43) to be an error.

Reference to the original report of this capture was made in my note, "A Banded Adult Common Cormorant," published in *Bird-Banding*, Vol. II, No. 1, p. 33, and it was considered to throw a slight doubt on the place of banding of an adult Common Cormorant seen with a band on its foot in a nesting colony of this species near Cape Whittle, Saguenay County, Quebec, on July 25, 1930. Now that it is shown that there is no valid record of the capture in North America of a Common Cormorant banded elsewhere, it is made so much the more certain that the banded adult individual mentioned above had indeed been banded as a juvenile in the colony in which it was observed, since this is the only place in North America where this species has been banded.—HARRISON F. LEWIS.

Notes on the Slate-colored Junco.—Local abundance of the Slate-colored Junco (*Junco h. hyemalis*) is apparently very irregular. Since I began banding birds in May, 1926, Juncos have been abundant at my trapping station only once. In the fall of 1928 and during the winter of 1928–29 they were quite plentiful. In October, 1928, 31 were banded; in November, 97; and in December, 11—a total of 139 for the three months. One was also banded in January, 1929, six in February, and one in March.

The more hardy individuals that remained all winter became very troublesome about the traps, repeating continually. One individual grew particularly tame, and acquired the "trap complex." It was first trapped November 21st in a six-by-six-foot drop-trap, in which practically all the Juncos were captured in the fall. November 23d it began to repeat in the two-, three-, and six-funnel traps, but mostly in the last-named trap. It repeated 195 times up to January 13, 1929, when it was last taken. The highest number of repeats recorded for one day is eleven. It spent practically the entire daylight time during the winter inside the six-funnel trap. The ever-present supply of food evidently constituted its chief source of subsistence during this period. Once when the bird was liberated, it alighted on a near-by fence. While I was closing the door of the trap, it flew down and calmly entered the trap through one of the funnels on the opposite side from where I was standing, about three feet away. Considerable trouble was encountered when the bird refused to enter the receiving-cage, from the six-funnel trap. This trap is three by six feet, and eighteen inches high. The bird could not be secured unless first driven into a receiving cage. It was exasperating when in my efforts to drive it into the cage, it would sometimes calmly sit and eat and would heedlessly

disregard all my gesticulations, which consisted of waving my handkerchief and cap in an effort to frighten it into the cage. It was obviously reluctant to leave the food. In an attempt to deceive the bird, a piece of poultry netting about three feet long, and as high as the trap, was bent at a right angle in the middle and placed in the corner of the trap near the door. This was then fastened at one end which served as a hinge. A long wire was attached to the free end and extended out through the wire of the trap, which could be pulled to close the opening, which was about eighteen inches wide, or wider if desired. Then, with much urging, the bird could be driven in and confined in this small inclosure, where it could be easily reached by my hand. But after the bird had been removed a few weeks in this manner, it gradually became obstinate and even refused to be driven into this corner. However, it soon left my station, and no more trouble was experienced. When the bird was free, it appeared to be normal and in a healthy condition.

Several other individuals repeated over thirty times. One Junco that had learned the way out of the funnels could be seen scurrying out every time the traps were visited, evidently the same individual. There was snow on the ground part of the time when the birds were repeating. They repeated frequently when the ground was bare, but oftener when the ground was covered with snow. The individual that repeated 195 times came almost as often when the ground was bare as when the ground was covered with snow. I have found that Juncos enter traps very freely when they first arrive in flocks in the fall, and also in the winter when there is snow on the ground. But I have found it difficult to trap them in the spring, when they are migrating north.

A few words of explanation concerning the traps I have been referring to as two-, four-, and six-funnel traps. The six-funnel, the largest, is three by six feet, and eighteen inches high, as previously stated. It has a funnel on each end and two funnels on each side, and is one of my best traps. The two- and four-funnel traps are similar, only smaller, and are also effective.—Lony B. Strabala, Leetonia, Ohio.

Purple Grackle Returns at Paoli, Pennslyvania.—Out of three hundred and five Purple Grackles (*Quiscalus q. quiscula*) banded at Paoli, Pennsylvania, during a period of four years (1927–30), of which only twenty-three were adults when banded, I have had only four returns, two of immature and two of adult birds, the complete records of which are:

No. 274347, adult banded December 2, 1923	Returned September 14, 1924
No. 316372, immature banded July 17, 1924	Returned April 16, 1925
No. 281371, adult banded April 23, 1925	Returned April 4, 1926
No. 288850, immature banded June 26, 1926	Returned May 28, 1927

This small number of returns (1.31 per cent) appears to indicate that birds of this race do not possess in a strong degree the habit so common with many species of returning to the place of birth or where they have previously nested.—H. D. McCann, Paoli, Pennsylvania.

A Blue Jay Sight Return-7.—Blue Jay (*Cyanocitta cristata cristata*) No. 352483 banded as an adult at Lakewood, Ohio, November 3, 1924, was not again heard of until recaptured on March 21, 1928, by Mrs. Frank Zink, 1337 Brockley Avenue, Lakewood, in her yard about three quarters of a mile south of the place of banding. At this time the writer replaced the band on the left leg as the hind toe of the right foot was injured. This Blue Jay had also received injuries to his right wing, which was drooping. The recognition marks for this bird, aside from his behavior, which is

distinctive, consist of the injured right hind toe, the drooping right wing, and the band on the left leg instead of the right. For some time previous to the date of his recapture and up to the present date, May 26, 1931, the bird has been a pet at the feeding station of Mrs. Zink, coming to her back porch early in the morning and calling if his breakfast of peanuts was not in place. I have had several Jays call for food at my feeding station, but, so far as I know, this bird has not returned to the place of banding. He is known as a male by his larger size and brighter plumage and also by the fact that he has brought several mates to his feeding-place, at least one of which is banded. Last September the bird left the vicinity and was not again seen until April 10th. This Jay, who is known to the neighborhood as "Crippy," is receiving special care and attention from Mrs. Zink, who hopes he will establish a record for Blue Jay longevity.

He was banded as one of a group of six, by their actions a family group, Nos. 352480-5 inclusive. Of these 352485 was recaptured at the place of banding January 1, 1925; 352484 was reported by E. R. Beetham, 1338 Summit Avenue, Lakewood, adjoining the Zink yard, as being injured by flying against a wire fence May 29, 1925, and 352481 returned to the station of banding on October 18, 1925.—E. C. Hoffman, 1041 Forest Cliff Drive, Lakewood, Ohio.

Albinism in a Purple Grackle.—On July 13, 1930, I captured and banded at my station at Paoli, Pennsylvania, a Purple Grackle (*Quiscalus q. quiscula*), No. 653917, showing marked albinism. This bird, a young-of-the-year, had a broad white band, slightly curved, about three fourths of an inch wide, extending the entire length of each wing, crossing the primaries and secondaries about an inch from their free ends. In addition, the feathers of the crown, nape, and anterior portion of the back were white-tipped, giving a curious mottled or checkered effect.—Horace D. McCann, Paoli, Pennsylvania.

An Easterly-Wandering Purple Finch.—Purple Finch C69545 was banded by me at my station in Sault Ste. Marie, Michigan, August 17, 1930, and was recovered by R. M. Hinchman in Milton, Massachusetts, February 14, 1931. The interesting part of this recovery is that when I banded the bird I believed it to be a young-of-the-year. It was moulting its body feathers but not the rectrices nor the flight feathers, and the tail-edging was rather bright sage-color, which indicates to me that it was a young bird. That this young bird should have been here in August and in Massachusetts February 14th rather indicates that it went directly east and not south, there joining a flock going north.—M. J. Magee.

A Prairie Horned Lark Return.—On March 14, 1930, at 8.44 A.M., I trapped and banded a Prairie Horned Lark (*Otocoris alpestris praticola*) and gave it band No. C51239. This bird, a female, was retaken as a Return-1 on March 2, 1931, at 12.32 P.M. at the same place and in the same trap as on March 14, 1930.

At the end of the year 1930 my total number of Prairie Horned Larks banded was thirty-eight, and the above is my first return of this species. These have been captured in a Dodson sparrow trap, and in a receiving-cage used as a trap by bending a wire so that it holds up the door, and also placed in such a position on the bottom of the cage that when the bird

steps or hops on it the door drops and catches the bird. Hay chaff mixed with grains, chiefly cracked yellow corn, have served as the best bait.—Oscar McKinley Bryens, McMillan, Luce County, Michigan.

Interesting History of Evening Grosbeak No. 462165.—In the *Bulletin of the Northeastern Bird-Banding Association*, Vol. IV, 1928, pp. 56–59, and in *Bird-Banding* Vol. I, 1930, pp. 40–41 and 145, I published considerable data showing an east-and-west movement of the Evening Grosbeak (*Hesperiphona v. vespertina*) between the Upper Peninsula of Michigan and New England and the Province of Quebec, Canada, to the east, and Minnesota to the west.

The following record of a female of this race adds more data supporting my published records.

The known history of female Evening Grosbeak No. 462165 follows:

Banded at my station	March 9, 1927
Returned to my station	March 12, 1928
Trapped by Mrs. Elizabeth L. Burbank at Sandwich, Mass.	March 22, 1930
Returned to my station	March 14, 1931

On this date the bird was at least in its fifth year.

The Evening Grosbeak can be found in the Upper Peninsula of Michigan at all seasons of the year. In summer it is confined mostly to heavily wooded areas where it nests.—M. J. Magee, Sault Ste. Marie, Michigan.

Banding Crows.—This year, Professor William Rowan, University of Alberta, Edmonton, Alberta, who has already done very good work in this connection, intends to continue his investigation concerning the general biology of the Crow, and, as the migration of this species will play an important part in his experiments, he has asked that all bird-banders in Canada be requested to band Crows on any opportunities that occur, in the hope of obtaining information regarding the movements of these birds.

Professor Rowan's work is of a very important scientific nature, and anything banders may do towards obtaining records of Crow migrations for the furtherance of this investigation will indeed be greatly appreciated by both Professor Rowan and this Branch.—J. B. Harkin, Commissioner, National Parks of Canada, Ottawa, Canada.

RECENT LITERATURE

Der Vogelzug, Vol. 2, No. 2, April, 1931. This number opens with a valuable summary of our knowledge of the wanderings of the birds of northern Asia by Tugarinow. North Asiatic birds are here grouped according to their migration routes, as follows:

1. Species which fly southward over a broad front across Asia. Of these there are several sub-groups. Those which traverse central Asia from the east largely follow the great Chingan, east of Mongolia, and their route is here termed the Chingan route. A great many Asiatic birds travel southwestward over Turkestan and reach India, Afghanistan, Persia, Arabia, or even Africa, as the case may be in individual species. This route is called the Turkestan route. A small group of central Chinese birds winter in Arabia and western India, and their migration is largely an east-west journey, which is here termed the east-west central Asiatic path.

2. Another assemblage of birds migrate along the Arctic coast of Siberia westward to the Atlantic Ocean. This path is termed the Arctic-Atlantic.

3. Another group of species follow the entire Asiatic coastline from the delta of the Lena River east to the Chuckche Peninsula, and thence south along the coast to the Malay Peninsula, and beyond to Australia. This is the Asiatic-Pacific route.

4. A few birds from northeastern Asia cross Bering Straits and then follow the western shores of North America southward, using what is termed the American-Pacific route.

5. A few species fly in spring from Japan over Amurland to the regions farther north, but in the autumn they migrate eastward to Bering Sea and south along the coast to Japan. This is the east-Siberian cross route.

The Chingan route is the one followed by the majority of the birds breeding in the Yenisei delta and valley; the Arctic-Atlantic path is used by species which also breed in northern Europe. The Turkestan route is used by a smaller number of species, mostly of west-Palearctic forms. Only a few of them actually get beyond the borders of Siberia, and these few winter in India and near-by parts. The birds which follow the Asiatic-Pacific route include those which breed on the shores of Bering Sea. The American-Pacific route is used by some birds breeding in extreme northeastern Asia.

Schüz discusses the migration of the Crested Grebe (*Podiceps cristatus*), as indicated by three return records of banded birds.

Kramer writes on bird-migration at great heights and concludes that the direction of flight is affected by coastlines and other topographical features of the landscape only in the case of low-flying birds. The same species may fly high on clear days and low on cloudy ones, and its direction of flight differs on the two occasions. He also notes that inasmuch as only a small percentage of the total bulk of a species flies low (or migrates actively in poor weather when it would tend to fly low), the number of individuals observed is not a reliable index to the abundance of the species.

Drost and Bock report on the results of the international observation stations' coöperative study of migration in the North Sea in the autumn of 1930. (A preliminary report was published in the January number of this journal.) They find that the line of flight across the North Sea is chiefly in a southwestern direction; a western flight is the usual one between Holland and England; the flight over the North Sea is not in accord with the supposition that some land is always visible to the birds. In many cases the sea, even in good weather, acts as a restraining influence on migration, by shifting the direction of the flight along the coast or to the coast. This restraining influence begins fairly strong and becomes weak

by October and appears to be correlated with the warm winds from the west.

Drost and Bock contribute another paper on German observations in the autumn of 1930, the article being a contribution to the study of the direction of migration in Germany.

Among the shorter notes is one by Schuster showing that the migration impulse is stronger in the male birds than in females in the Hen Harrier (*Circus cyaneus*). He finds that the birds which fail to go south for the winter are chiefly females (75–80 per cent). Schüz comments on Wenzel's and Stresemann's notes on the wintering of Vaux' Swift (*Chætura vauxi*) in Guatemala. H. F.

Venatoria, Anno 1, No. 2, March 1931-IX.[1]

The Ornithological Station at Castel Fusano is to be operated for the protection and study of birds and for the benefit of the hunters of Migratory Quail in Italy. The station is situated on a belt of dunes extending along that part of the coast lying some twenty-five kilometers southwest of Rome. Trapping and banding methods are employed, the major purpose being at present to study the habits of the Migratory Quail (*Coturnix coturnix*), the investigations to date having covered a part of the spring migration of 1930.

The equipment of the station consists of the trapping station on the highest part of the dunes, an area well situated to receive the flocks of Quail as they arrive from northern Africa. A line of three-fold nets parallels the belt of dunes some sixty meters from the shore. A small building has been erected near-by which is used as a laboratory for scientific work and where all records are kept.

The author states that the prime matters being investigated are the determinations of the migration routes followed by the Quail; the direction of migration; the areas the birds favor for nesting purposes; the distribution of the sexes while in migration; the behavior of the birds as determined by sex and age; speed of migration and sustained migration flights.

Of the one hundred and thirty Quail banded mainly between May 7th and June 10th, ten were recovered at various places in Italy. The three most important recoveries were Numbers 65, 82, and 127, all male birds. Numbers 65 and 82 were killed by gunners on the littoral at Monte Conero, twelve kilometers southeast of Ancona, during May 18th and 19th following their banding on May 17th and 18th. Ancona is situated on the Adriatic Sea approximately one hundred and forty miles northeast of the place of banding. The third bird, Number 127, banded June 2d, was found dead on the beach at Fano, also on the Adriatic, the morning of June 3d, one hundred and fifty miles distant. These recoveries, the author states, show

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[1] A copy of this Italian periodical, which is devoted to hunting, as its name signifies, including a translation of an article appearing therein by Prince Francesco Chigi, was kindly sent to the editor by Dr. T. Gilbert Pearson, who had the translation made. This article gives some of the results of the first season's campaign (May to July, 1930) at the banding station of Prince Chigi at Castel Fusano near the mouth of the Tiber. In addition Dr. Pearson sent a copy of a personal letter from Prince Chigi enclosing information regarding the two important Italian Experimental Sanctuaries for the protection and study of birds which have been established since 1928. The Osservatorio Ornitologico del Gardo, situated at the Spino Mountain Pass above Salo is under the technical direction of Dr. Antonio Duse. This sanctuary was promoted by the Ancient Society of Brescian Huntsmen. The second Zoölogical Experimental Station to be established was that of Prince Chigi above mentioned.

It is gratifying to note that, doubtless as a result of the efforts of the International Committee for Bird Conservation, of which Dr. Pearson is Chairman, a real beginning has been made in the conservation of bird-life in Italy by the establishment of bird sanctuaries where important ornithological investigations will be conducted.

a surprising but distinct northeastward migration, the birds almost certainly coming from Tunisia across the Mediterranean Sea to the Roman littoral and then passing overland across the Italian peninsula to the Adriatic. Previous to these findings it has been supposed that the Quail reaching the coasts of the upper and middle Adriatic came from Egypt or Albania. Moreover, evidence is cited to show that the Quail migration along the Adriatic littoral is earlier than that along the Tyrrhenian littoral. Future banding results are expected to confirm or disprove this theory.

The seven remaining recoveries, with one exception, were made by gunners, and with one exception they were all females. Four birds were recovered in Northern Italy, all of them during the months of August and September, from which it appears that not all the migrants arriving at the Roman littoral in May and June continued northeasterly across the Adriatic, but dispersed to other nesting-grounds in Italy. No theory is offered in explanation of the fact that nearly all the banded birds recovered in August and September were females.—C. L. W.

Bird-Banding by Systematic Trapping.—By S. Prentiss Baldwin. Scientific Publications of the Cleveland Museum of Natural History, Volume I, No. 5. This attractively printed pamphlet consists of reprints of two earlier publications of Mr. Baldwin which are to-day out of print and difficult of access to many bird-students. They are of considerable historical value to all bird-banders, for their publication in their original form aroused much interest and resulted in a radical change in banding methods and in a wider adoption of this method of bird-study. The first of these papers, on "Bird-Banding by means of Systematic Trapping," was given in substance at the New York meeting of the American Ornithologists' Union in 1919 and later formed the basis of the first instruction book for banders issued by the Bureau of Biological Survey. Previously banding had been limited almost entirely to nestling birds, and no definite effort had been made to recapture these birds at a subsequent time. This, and the high mortality during the first year, caused discouragingly few recoveries or returns from banding activities, but Mr. Baldwin demonstrated that when adult birds were trapped, banded, and released, the percentage of returns was much higher. The second article, on "The Marriage Relations of the House Wren," appeared in the *Auk* in April, 1921, and also aroused great interest, for it indicated clearly that bird-banding might reveal many details in the life-histories of our birds which could not be learned by any other method of study. The present pamphlet should be in the library of every bird-bander.—J. B. M.

The Auk. Volume XLVIII, No. 1, January, 1931. Again a bird-bander has added a new species to the list of birds known from Massachusetts. In a brief note in this issue, Dr. Oliver L. Austin, Jr., reports the taking of four Clay-colored Sparrows (*Spizella pallida*) at the Austin Ornithological Research Station, North Eastham, Massachusetts. The first two birds were collected and placed in the Museum of the Boston Society of Natural History; the other two were banded and released. The dates on which these birds appeared, September 20 (two), October 11, and November 3, 1930, suggest that this species may be a regular straggler to New England which has been overlooked in the past through its close resemblance in the field to the immature or winter plumages of the Chipping Sparrow, which it closely resembles in size, form, and habits.—J. B. M.

The Auk. Volume XLVIII, No. 2, April, 1931. This issue contains some additional matter on the Double-crested Cormorant by Dr. Harrison F. Lewis, supplementing his "Natural History of the Double-crested Cormorant," which was reviewed in *Bird-Banding* for April, 1930. It includes several recent recoveries of banded cormorants, birds from colonies in Quebec having been reported from North Carolina and Georgia, and three from Florida. A bird banded at Big Quill Lake, Saskatchewan, was recovered at Lake of the Woods, Ontario, and another was taken about one hundred seventy-five miles northeast of its birthplace a little over two months after it was banded. Dr. Lewis remarks, "No record showing complete crossing of the Florida peninsula by a bird from either east or west has yet come to my attention."—J. B. M.

The Condor. Volume XXXIII, No. 3, May-June, 1931. This issue contains a suggestive article by John B. Price entitled "An Experiment in Staining California Gulls." Eleven gulls were captured at Glendale, California, during May, 1930, in a special pull-string trap six feet square and three feet high. The birds were banded and in addition were stained on the breast and under the wings with a bright red stain formed by dissolving an ordinary artist's oil color (scarlet lake) in carbon-tetrachloride, a dye developed by Dr. Wilbur K. Butts of Cornell and described in the *Auk* for July, 1927. Only one marked gull returned to the place of banding, and another was picked up dead two days after marking, at a point seventeen miles distant. Another was observed six miles from the point of marking, and three reports came from a place about three quarters of a mile from the original station. Probably better results would have occurred had the marking taken place earlier, as all the gulls, marked and unmarked, soon left the neighborhood for their breeding-grounds. Similar experiments should be tried wherever conditions are favorable.

E. L. Sumner reports on six birds recently recaptured by himself near Berkeley, California, where they had been banded by E. D. Clabaugh from five to six and a half years previously. The oldest band was on a Spotted Towhee banded on August 23, 1923, and was the first band ever placed by Mr. Clabaugh. Two other Towhees had been banded on June 21, 1924, and November 11, 1924, respectively. Two Fox Sparrows banded in February and March, 1925, were taken, and a Golden-crowned Sparrow banded in February, 1926. All except one Fox Sparrow were recaptured between January 11 and February 5, 1931.—J. B. M.

Wilson Bulletin. Volume XLIII, No. 1. This issue contains an interesting article by Manley F. Miner entitled "Migration of Canada Geese from the Jack Miner Sanctuary and Banding Operations." The first wild duck banded by Jack Miner, on August 5, 1905, at his sanctuary in Kingsville, Ontario, was killed a little over five months later, on January 14, 1910, near Anderson, South Carolina. The first Canada Geese were banded in the spring of 1915, and the first recovery was from a bird killed by an Indian in unsurveyed territory in the Hudson Bay District, on August 19, 1915. Since 1915 Mr. Miner has tagged about six thousand Canada Geese and has had a great many recoveries reported. From these recoveries the inference is drawn that his spring and autumn visitors belong to two separate groups of birds. Geese banded in the fall of the year at Kingsville apparently winter in the Central States east of the Mississippi River and south to the Gulf of Mexico, but do not reach the Atlantic Coast. Geese banded in the spring at Kingsville apparently breed "in the extreme northerly portion of Hudson Bay and in Baffin Land." In the fall they

migrate along Labrador, Newfoundland, and the New England coast to the region of Currituck Sound, where they winter in numbers, and in spring they head inland and appear at Mr. Miner's Sanctuary in March and April. Large numbers of these tagged geese return to the Sanctuary, and the statement is made that "this fall 100 geese out of 500 which stood on one of our ponds wore tags."

This article again calls our attention to the need of a more uniform nomenclature in this branch of the study of birds. The Miners "tag" their geese, the British ornithologists "ring" their birds, and most of us in the United States "band" ours. And when it comes to reporting the results of our efforts at "tagging," "ringing," or "banding," there is confusion worse confounded, for but few agree as to the meanings of simple words like "repeat," "return," and "recovery." That the pioneers in the bird-banding movement did not realize in advance all the complications, and that the Biological Survey did not in its early records differentiate between different types of what they loosely termed "returns," does not excuse our continuing the confusion indefinitely.—J. B. M.

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